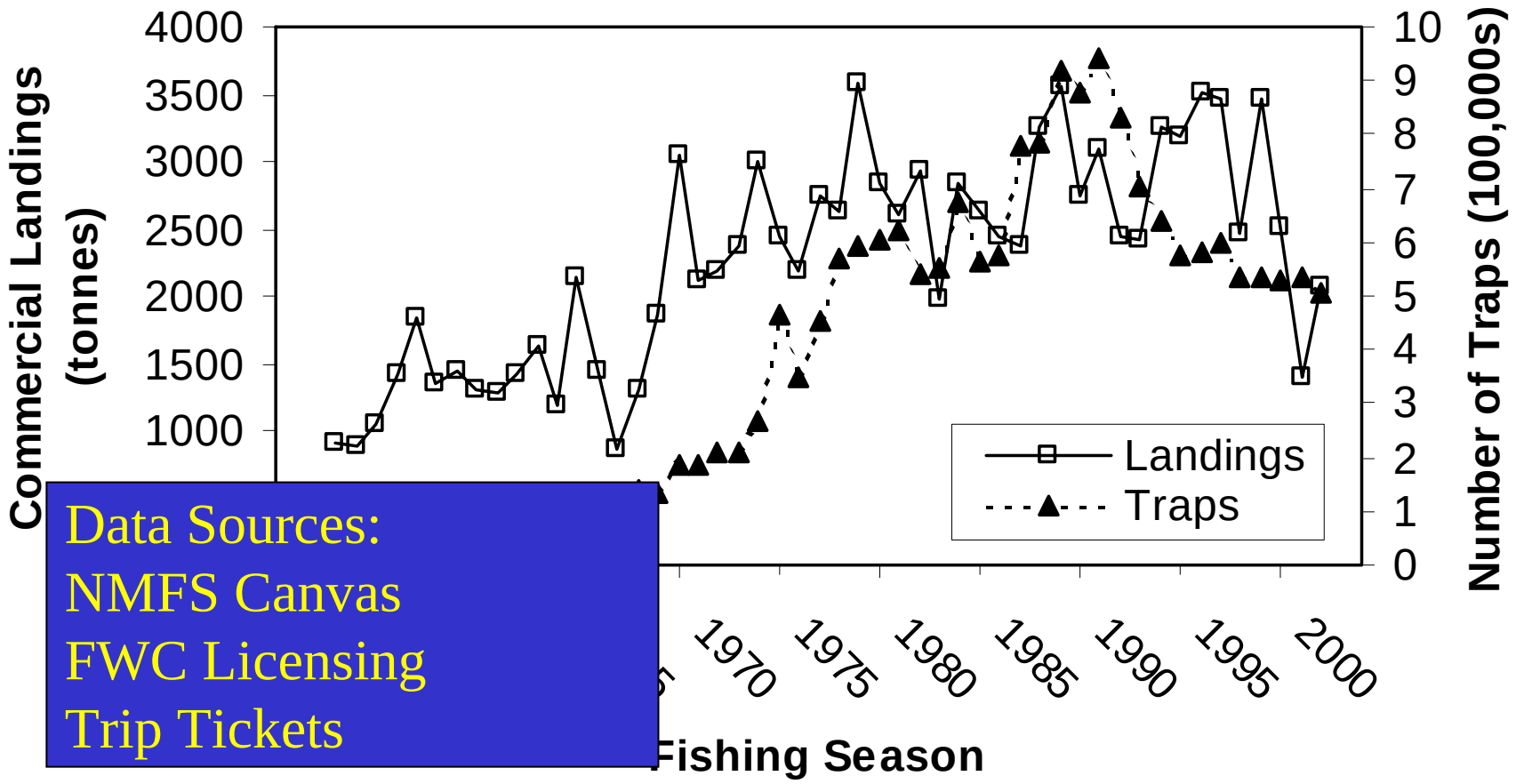
Fishing Effort Estimation for the Caribbean Spiny Lobster, *Panulirus argus*

What is the most appropriate way to measure fishing effort?

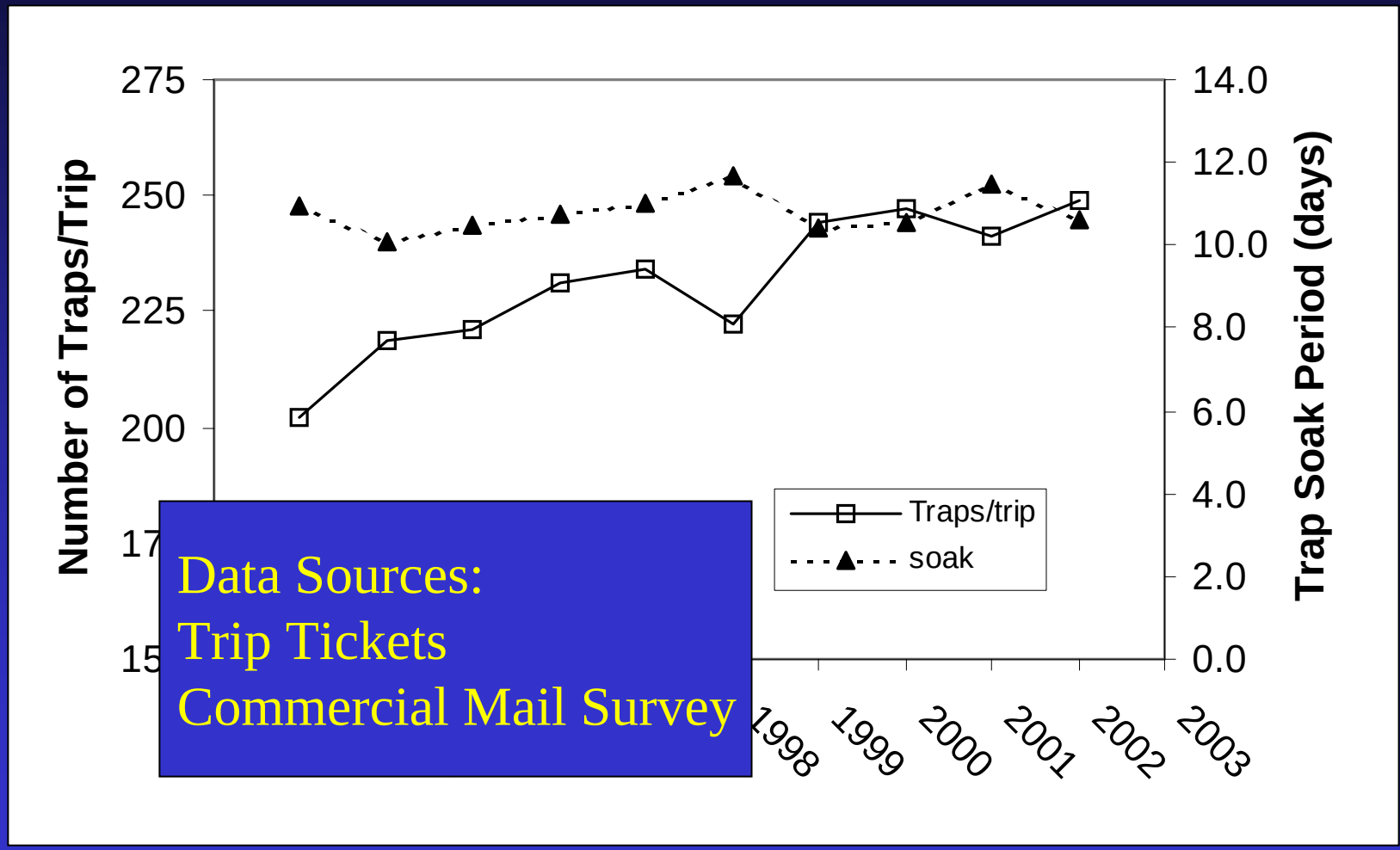
- Number of fishermen
- Number of traps
- Number of fishing trips
- Number of trap hauls
- Number of trap deployment days

Traps and Landings



Data Sources:
NMFS Canvas
FWC Licensing
Trip Tickets

Traps per Trip and Trap Soak Period



Estimated Number of Trap Hauls

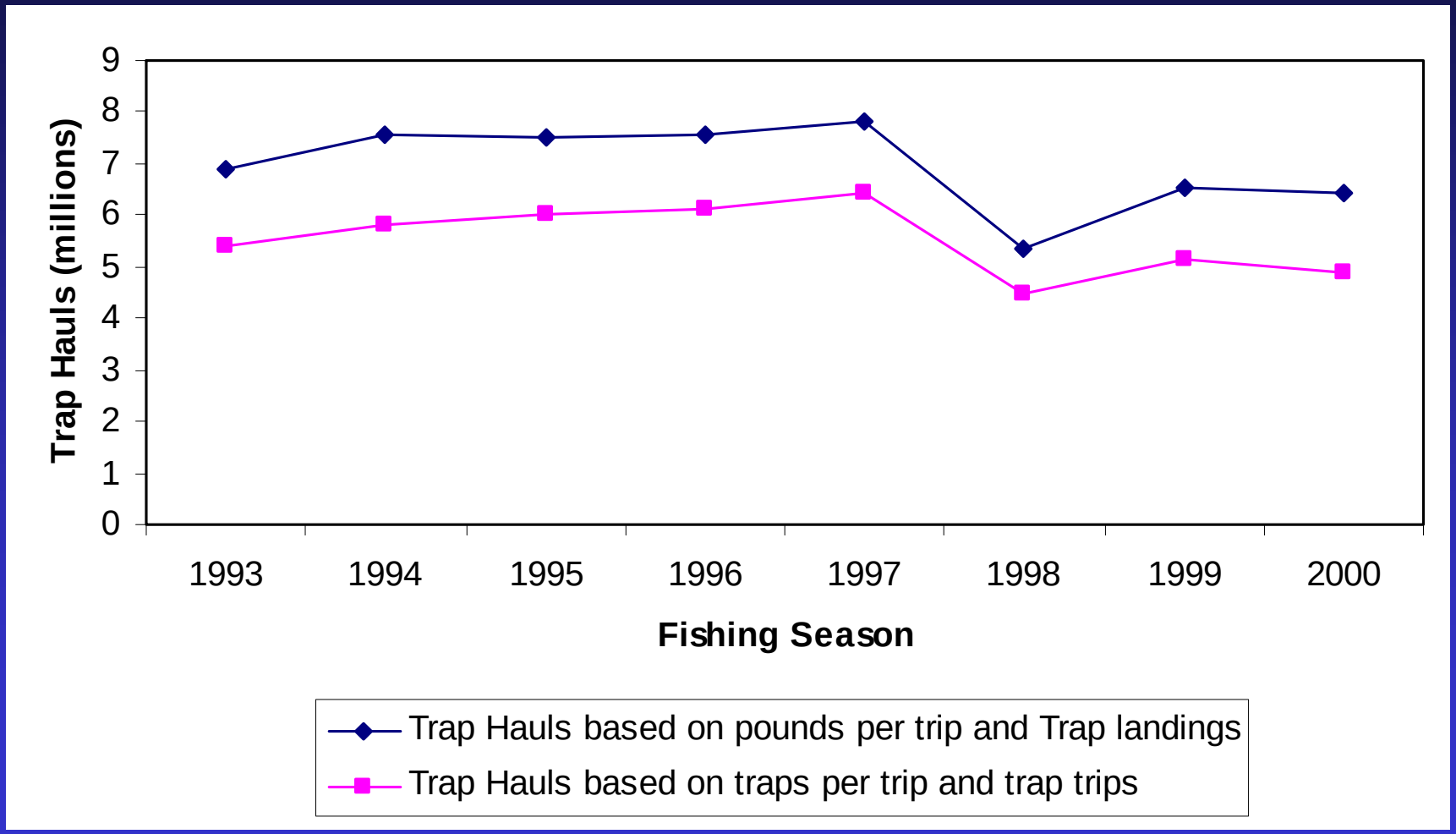


Table 1. Trap landings, the estimated number of trap hauls, the number of lobsters confined as bait, the average number of bait lobsters used per trap, and the estimated mortality of bait lobsters

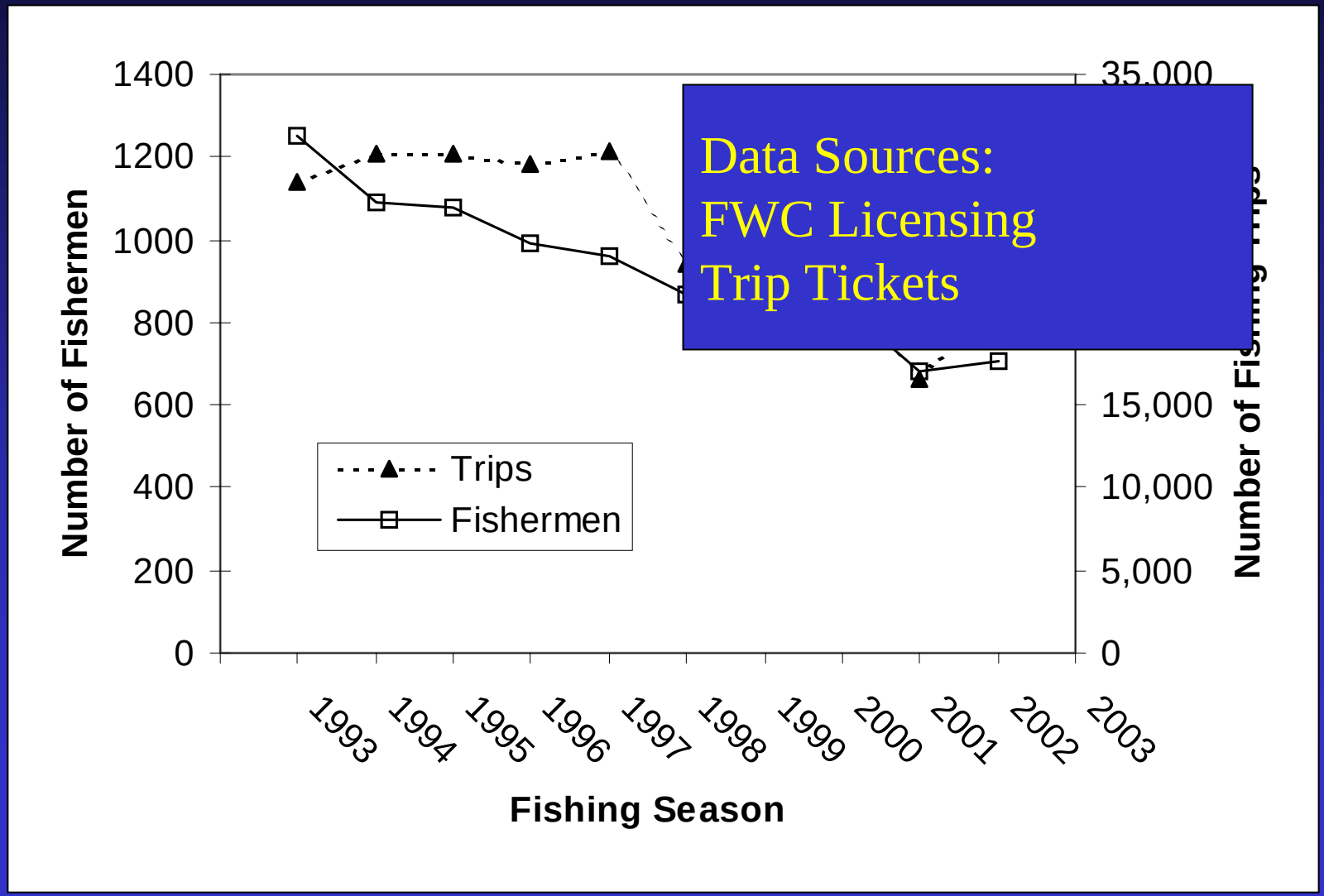
Trap hauls based on pounds per trap and trap landings

Fishing		Bait usage					Bait Mortality		
Year	Landings (lb)	Trap Hauls	Shorts	Legals	Total bait	Ave bait / trap	Shorts	Legals	Total bait
1993	4,914,854	6,912,440	12,286,739	334,597	12,621,336	1.83	1,429,849	31,794	1,461,642
1994	6,717,022	7,572,416	14,053,511	831,129	14,884,640	1.97	1,573,963	74,460	1,648,423
1995	6,529,937	7,496,858	13,554,538	630,763	14,185,301	1.89	1,545,111	56,861	1,601,971
1996	7,187,142	7,572,084	15,171,175	1,219,461	16,390,636	2.16	1,743,094	114,822	1,857,916
1997	7,060,925	7,841,694	16,122,765	340,158	16,462,923	2.10	1,868,369	32,999	1,901,368
1998	4,839,664	5,371,201	6,584,814	445,952	7,030,766	1.31	827,661	38,311	865,972
1999	6,857,239	6,532,515	14,043,479	574,755	14,618,235	2.24	1,543,273	49,351	1,592,624
2000	4,717,167	6,443,577	11,816,912	489,055	12,305,967	1.91	1,359,977	42,212	1,402,189
Average	6,102,994	6,967,848	12,954,242	608,234	13,562,475	1.93	1,486,412	55,101	1,541,513

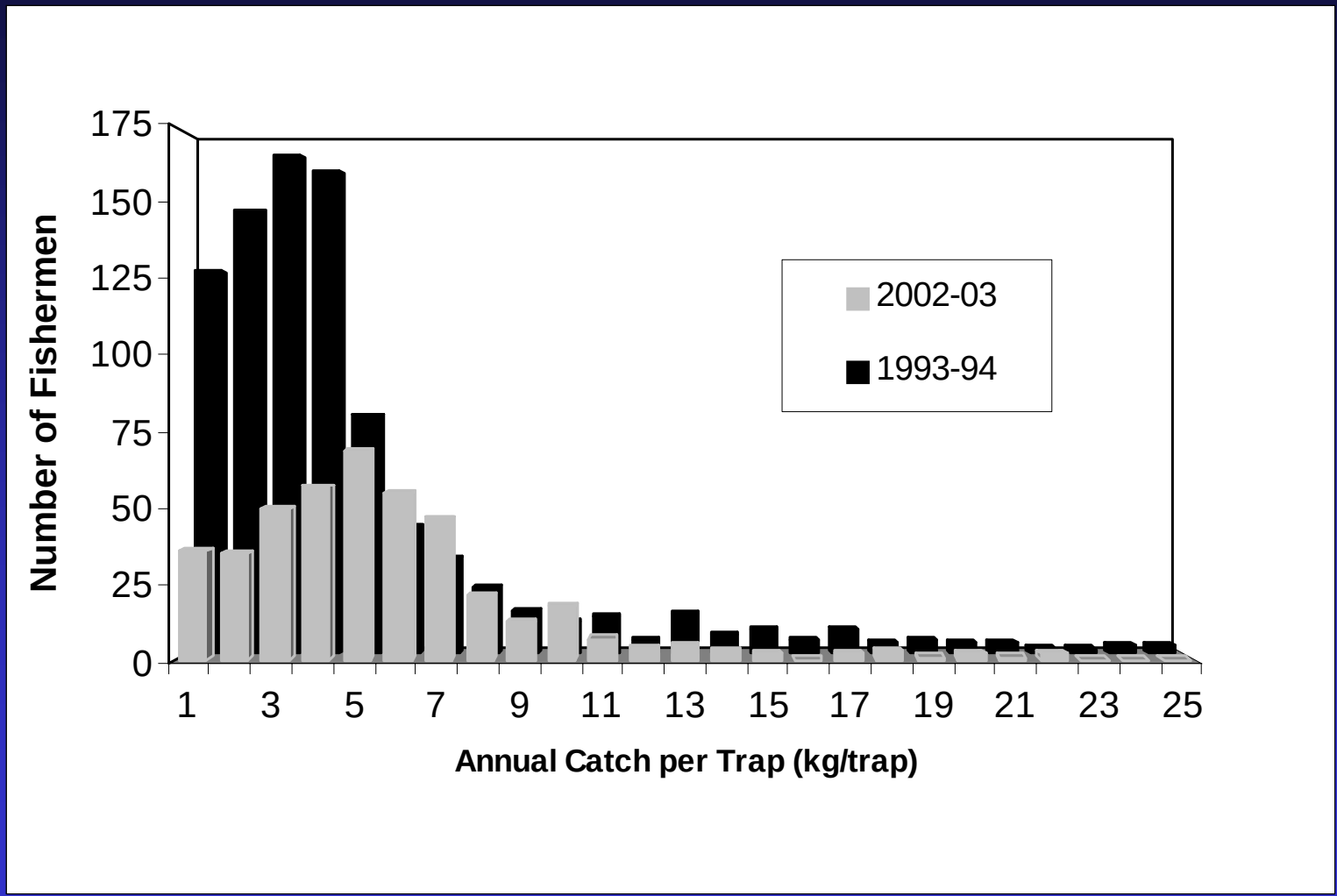
Trap hauls based on traps per trip and trap trips

Fishing		Bait usage					Bait Mortality		
Year	Trips	Trap Hauls	Shorts	Legals	Total bait	Ave bait / trap	Shorts	Legals	Total bait
1993	26,913	5,404,947	9,499,418	273,916	9,773,334	1.81	1,091,124	25,899	1,117,024
1994	27,648	5,813,182	10,424,316	716,603	11,140,919	1.92	1,117,679	63,025	1,180,704
1995	27,834	6,007,512	10,841,963	498,581	11,340,544	1.89	1,229,704	44,739	1,274,443
1996	27,269	6,100,181	12,080,547	993,254	13,073,801	2.14	1,350,247	92,147	1,442,394
1997	28,368	6,428,750	13,152,184	280,154	13,432,338	2.09	1,514,259	27,107	1,541,366
1998	20,945	4,449,118	5,231,049	395,476	5,626,525	1.26	645,515	33,957	679,471
1999	22,681	5,130,075	10,808,100	481,930	11,290,031	2.20	1,153,762	41,183	1,194,945
2000	20,463	4,892,815	8,818,298	405,171	9,223,468	1.89	978,505	34,799	1,013,305
Average	25,265	5,528,322	10,106,984	505,636	10,612,620	1.90	1,135,099	45,357	1,180,456

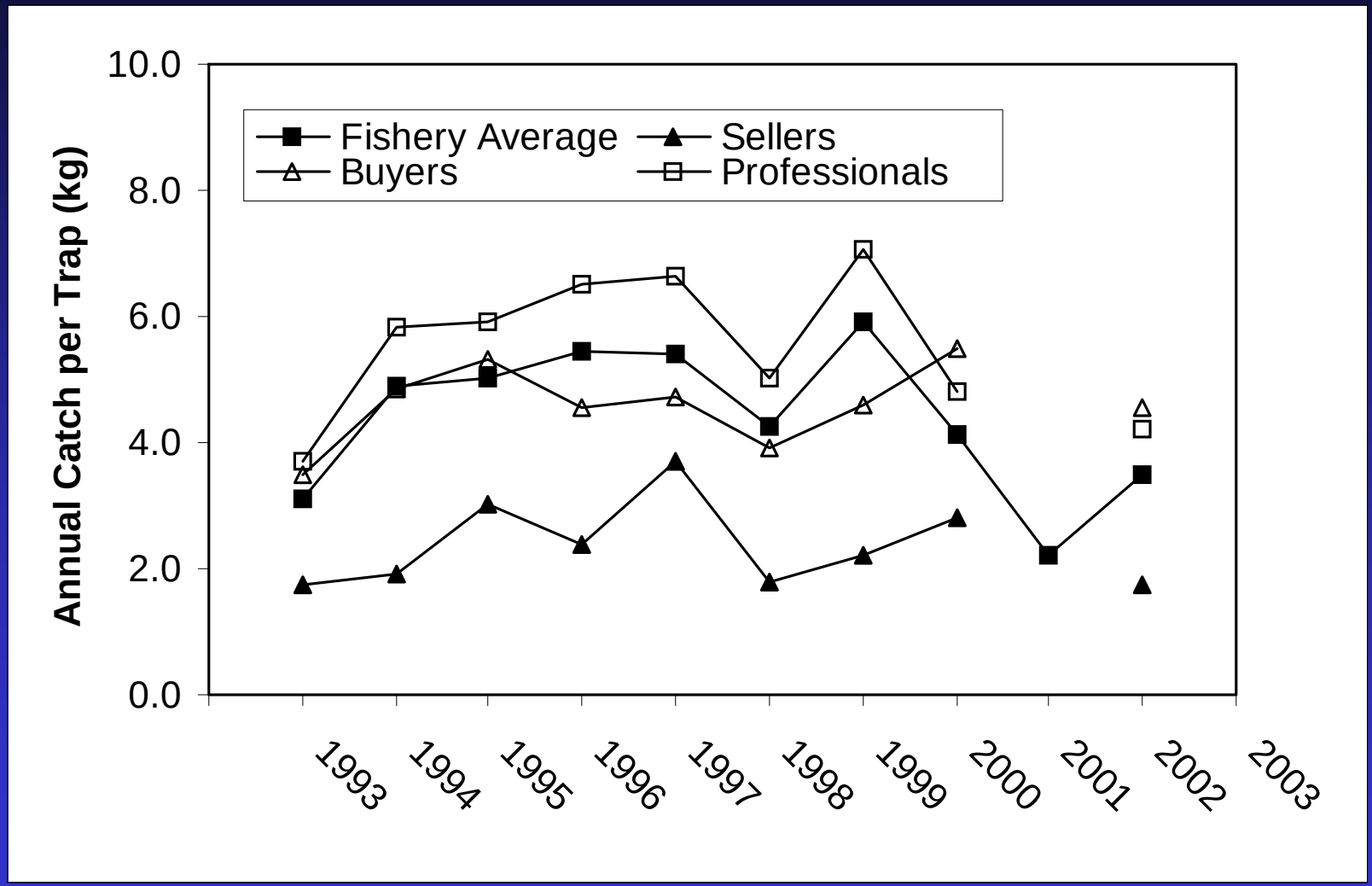
Number of Fishing Trips and Fishermen



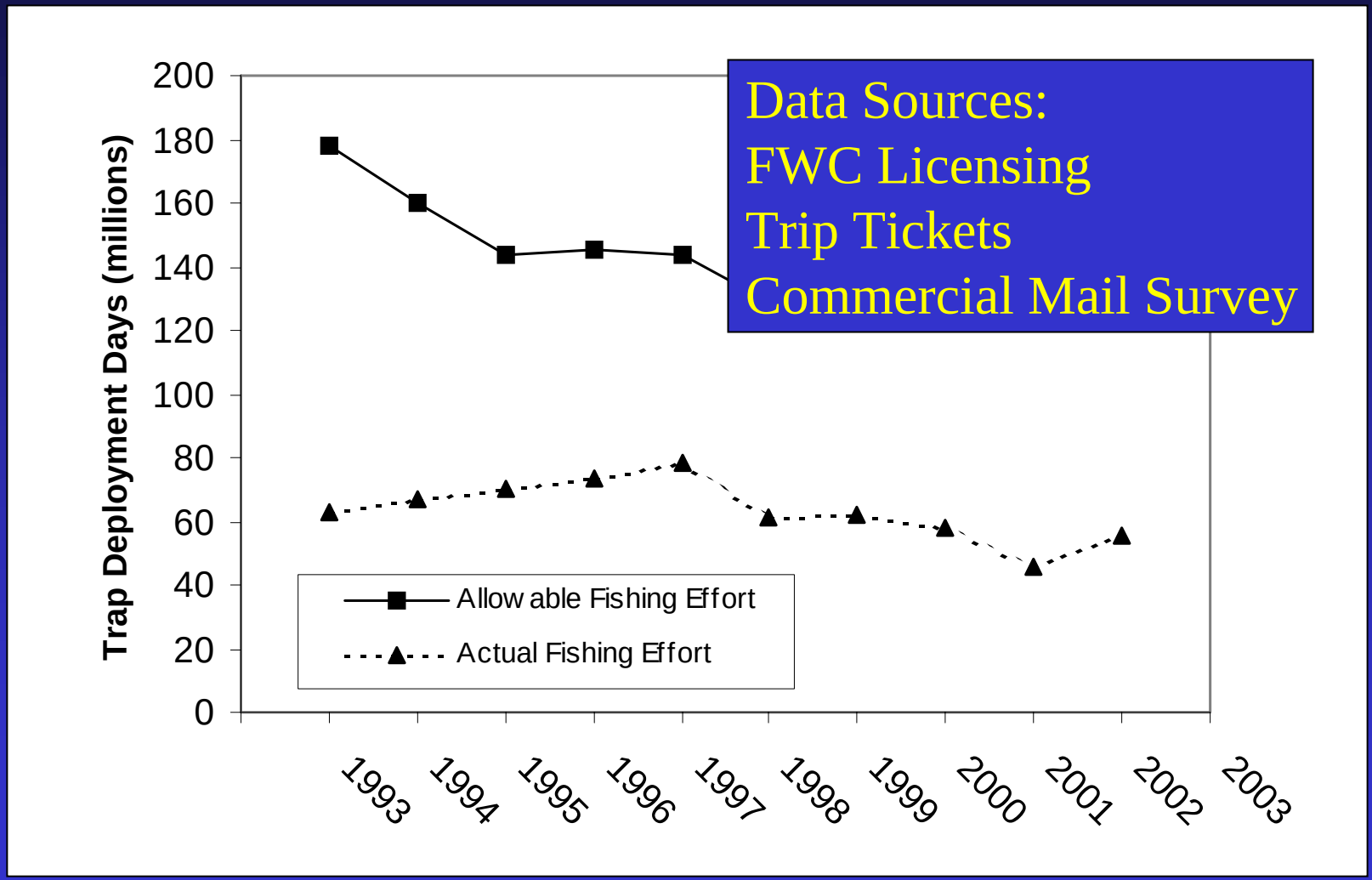
Fishermen Catch Rates



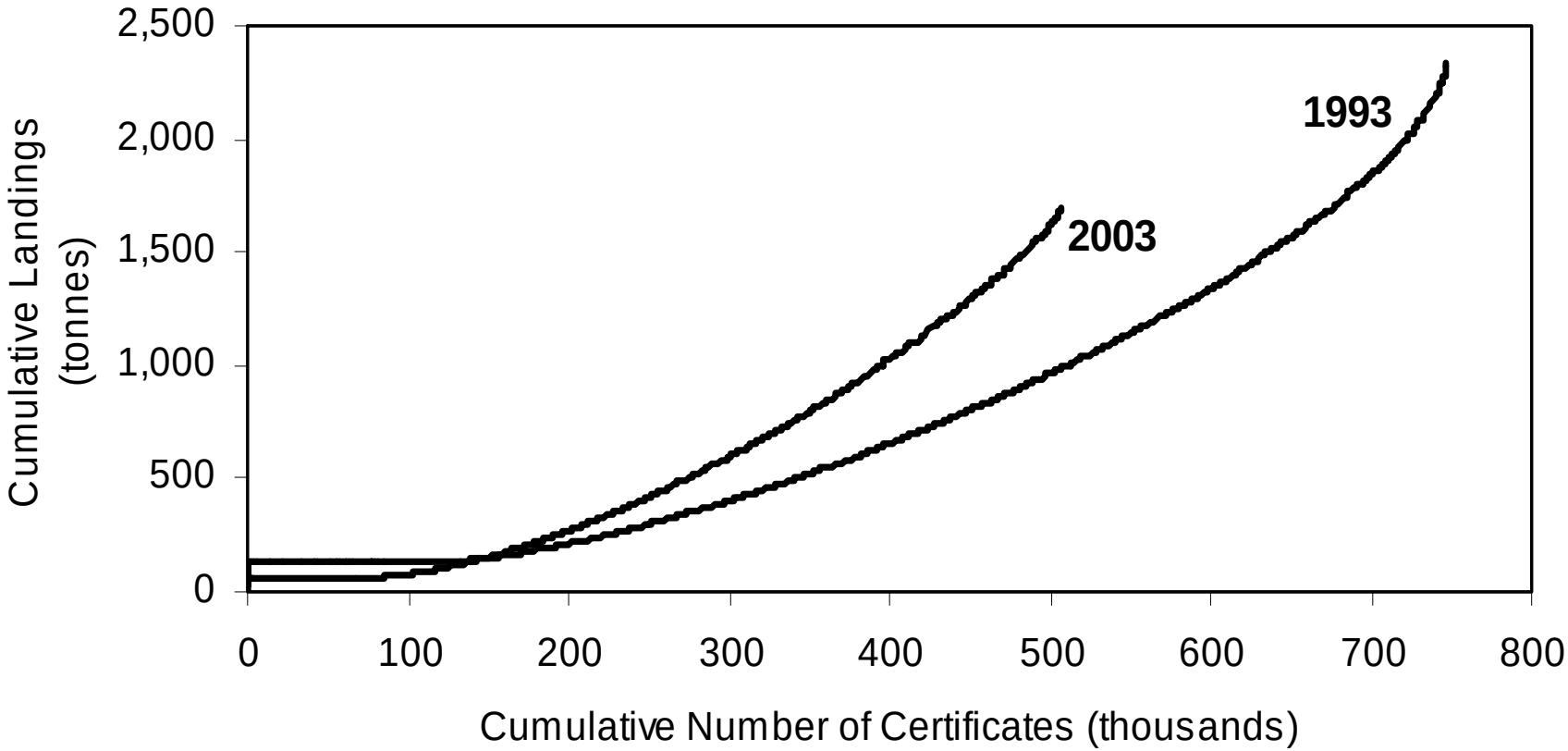
Catch Rates and Trap Certificate Transfers



Trap Deployment Days
Allowable vs. Actual



Latent Effort



Potential areas for discussion

- Does the number of traps affect landings?
- Has the reduction of the number of traps affected anything?
- What has caused the change in the number of traps per trip?
- How does trap soak time change with lobster abundance and how does this affect the number of trap hauls or the number of fishing trips
- Are there really 80,000 traps with no landings? Who do they belong to?
- How does the determination of effort affect stock the assessment?
- What is the most appropriate measure of fishing effort?